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P A P E R S
IN
P O L I T E A R T S.

No. I.

ETCHING GROUND FOR ENGRAVERS.

The THANKS of the Society were this session voted to Mr. EDMUND TURRELL, of Clarendon-square, Somers-town, for the following communication on the mode of preparing Etching Ground for Engravers.

THERE are few articles of more importance to copper-plate engravers than the compound commonly called etching ground. This observation need not be enforced by any practical illustration, as all engravers have at one time or another had sufficient experience to establish the fact.

As there are many recipes in existence, and several of them almost equally good, it is very difficult to make choice without considerable experience, and even then, however judiciously the materials may be proportioned,

yet failure may take place, from the bad qualities of the ingredients, or an improper method of compounding them.

The first object of this paper will be to describe the several materials in their genuine state, together with their characteristic properties.

Secondly, the best method of compounding them, and also their general proportions; with rules for varying the same as occasion may require.

The most important and indispensable material is asphaltum. I believe there is no substance in nature that can completely supply its place; and, indeed, however good all the other materials may be, if this one is bad nothing can be added to make up for its impurity. Asphaltum, or Jews' pitch, is a solid mineral bitumen, supposed by many naturalists to have originated from fluid petroleum, or mineral tar, inspissated by some natural process of evaporation.

The tar that is obtained in the distillation of bituminous coal, by the common process of preparing coal gas, bears a considerable resemblance to petroleum, and if properly treated, by gentle evaporation, first forms a complete mineral pitch, and, by a continuance of the process of evaporation, it at last attains the consistence of asphaltum. This artificial asphaltum is found to answer nearly all the purposes of the natural production, as an ingredient in the coarse black varnishes, such as are used for coach tops, and a variety of japanned wares, such as coal-scuttles, and most of the common iron articles that are required to be preserved from rust by the application of common and cheap varnish.

The artificial asphaltum has a fracture so nearly re-

sembling the natural, that it is very difficult to distinguish them by mere external inspection; yet, generally speaking, the former is of a deeper black colour than the latter, the best of the natural kind being of a fine deep dark brown colour: it is used frequently as a glazing colour in oil painting, and is likewise said to be the article which constitutes the basis of the cake colour used in water colour painting, and known by the name of Vandyke brown. If a small piece of the artificial asphaltum be laid upon a hot iron, the vapour will be very nearly the same as that produced from a piece of coal placed in a similar situation, and a coaly cinder will remain behind.

The most certain method of detecting the natural from the factitious is by the smell.

The products that arise with the tar, in the distillation of coal, and are more or less combined with it, are sulphur and ammonia; which substances, although very volatile in their pure state, have so strong an attraction for the tar as by no means completely to separate from it during its conversion into the artificial asphaltum; therefore, when we submit this substance to the test of hot iron, the ascending vapour has always a nauseous odour, in which both sulphur and ammonia may be distinguished.

The presence of these substances in the artificial asphaltum made from coals, evidently renders it very unfit for the purpose of making etching ground; because, as dilute nitrous acid is used to corrode the copper plate, in the process of *biting-in*, the well known affinity of the acid for the alkali will cause a decomposition of the etching-ground, and shallow or rough bitings will be the consequence. I shall also add, that etching ground, made of such asphaltum, will sometimes act slightly upon the

copper-plate, if the ground should be left upon it for a considerable length of time, and a stain will be produced upon the surface, productive, in some cases, of much evil in the process of *biting-in*. I trust these observations will be deemed as sufficient reasons why the artificial asphaltum should be rejected in making etching-ground.

When a small piece of genuine Syrian asphaltum is placed upon a hot iron, it will, if it be very good and pure, be nearly all converted into vapour, the smell of which is by many persons considered to be agreeable. The essential oil of turpentine dissolves it completely, and forms a liquid varnish that resists the action of dilute nitrous acid. Hence some engravers use it to cover the etched lines on copper plates that have been sufficiently corroded by the nitrous acid in the process of *biting-in*. I have frequently observed, that the atmosphere does not act upon the surface of pure asphaltum to decompose it, and perhaps it is on this account that it appears to have been so largely used in the composition employed to cover the mummies of the Egyptians.

The above-mentioned properties that pure asphaltum possesses, of resisting the action of dilute nitrous acid, and also of giving hardness and toughness to etching-ground, render it completely indispensable, and consequently an ingredient of the very first importance.

The second, and scarcely less important substance, is Burgundy pitch. This is obtained from the *pinus abies*, or Norway spruce-fir-tree. After the resinous matter is collected from the tree, which is by incision, it is boiled in water, and strained through a linen cloth, and packed in casks or bladders for exportation. It is chiefly pre-

pared in the neighbourhood of Neufchatel, and comes to this country through Saxony.

The best for making etching-ground is sold in bladders, and when perfectly good is of an opaque yellow, rather darker than straw colour. By age it becomes superficially transparent, and at the same time, probably by the loss of its essential oil, becomes so brittle as to be rubbed down between the fingers. That which is the most recent, and therefore opaque, is the best for the engraver's use, as it effects a more complete solution of the asphaltum.

The third and last article is virgin wax. That which is brought from the East Indies is, in general, the best. Most of the English wax is adulterated with deer's suet, which makes it very unfit for the purpose of making etching-ground, because it destroys the toughness and adhesion of the ground to the copper plate. This adulteration may be very easily detected by its softness and clamminess to the feel, and also in its being less transparent when interposed between the eye and the light. If the surface of fine wax be rubbed with a linen cloth, it will take a considerable polish, or gloss, while that which is adulterated will be comparatively dull. If thin shavings are cut with a sharp clean knife from genuine wax, the edge of the knife will leave a fine polished surface where the shaving is separated; but wherever adulteration with suet has taken place, the polish will be proportionably wanting. As these three ingredients (when pure) are all that are necessary to make good etching-ground, I consider it quite useless to multiply the number. Asphaltum, it has been stated, is indispensable, and therefore must

be had at any price. The other articles may be obtained without difficulty.

General directions for preparing and compounding the ingredients above named.

The asphaltum must be broken into small pieces, and if any pieces of clay or other impure matter are observed, they must be carefully taken out, and then it must be ground very fine in a marble or Wedgwood-ware mortar; and while it is under this process, if any hard stony material is discovered, it must be carefully taken out; it will then be ready to be mixed with the other materials, in the following manner.

Put four ounces of Burgundy pitch into a well glazed pipkin; let it melt gently over a slow fire, and move the pipkin round, so that the whole internal surface may be covered with the melted pitch. Then add four ounces of the ground asphaltum, and let the pipkin remain upon the fire until the two substances are tolerably well mixed, which will soon be effected if the mass be well stirred. Then add four ounces more of the asphaltum, and if the heat be increased, and the mass well stirred, the whole may be incorporated, and will be nearly as fluid as melted pitch.

When the asphaltum appears to be thoroughly melted, it should be kept in that state for at least a quarter of an hour, the heat being a little lowered, but it must be stirred all the while, by which means a large portion of the moisture of the Burgundy pitch will be evaporated; and the essential oil of the pitch well be thoroughly incorporated with the asphaltum, and render the etching-ground

more perfect ; for when this is omitted, evaporation takes place from the ground when spread upon the plate, after it has been laid on for a month or more, and sometimes in a shorter time, a circumstance which very often produces considerable difficulty to engravers, because when that takes place, the ground is rendered brittle, and frequently chips or flies from the plate, to the great detriment of the tints or lines ruled upon it. When the asphaltum and Burgundy pitch are thus prepared and incorporated, add six ounces of the best virgin wax, and keep the whole well stirred till it is completely mixed, and let it simmer gently for about ten minutes, when it may be taken from the fire, and suffered to cool until it is of the consistence of turpentine, or very thick treacle, and in that state it may be poured out upon the clean surface of a copper-plate, or well glazed earthen-ware dish, in portions sufficient to make a ball, which may in general weigh about an ounce, and when it is sufficiently cold, it must be rolled up into balls by the hands, and kept perfectly clean for use, provided it is found upon trial to be of the proper consistence, but this cannot be judged of until it has been laid upon the plate for a few hours. If it is too soft the etching point will make the lines of unequal breadth, or, as they are technically called, will be drag-lines, being in some parts very fine, and in others very gouty or thick. If it is too hard, the etching point will cause the lines ruled on the ground to chip, and then the edges will be notched or serrated, which would be very prejudicial to the appearance of fine even tints.

There is also another property that may be wanting where the proportions are not properly adjusted, namely,

that of spreading kindly on the copper-plate. This fault in ground may be easily remedied, by the addition of a proper quantity of Burgundy pitch.

As each of the evil qualities above-named are likely to happen, on account of the different properties of the materials: and as, on that account, *general principles* or directions will be much more acceptable than mere arbitrary recipes, I shall now endeavour to lay down such *general rules*, that when either of the faults before described occur it may be immediately remedied.

In the first place, asphaltum makes the ground hard and tough, therefore if it wants that quality, more asphaltum must be added, but it must be previously dissolved in a proper proportion of Burgundy pitch, for otherwise it will be very difficult, if not almost impossible to get it thoroughly incorporated, after the virgin wax has been added. The propriety of this caution will be evident, when it is considered that Burgundy pitch is the *real solvent* for the asphaltum, and must therefore at all times be incorporated with it first; and for this reason it will always be the best way to make the ground rather too hard than too soft, because it is much easier to soften it than to make it harder.

Should the ground, upon trial, be found too hard, a small quantity of virgin wax may be added, which is all that is necessary to answer that purpose.

If, upon trying to lay it upon the copper-plate, it does not spread kindly, but clings to the dabber, and only partially covers the surface of the copper, this fault may be remedied by adding a small quantity of Burgundy pitch; but should this property prevail, and the ground also appear upon trial too soft, then Burgundy pitch and asphaltum

must both be added, after they have been thoroughly incorporated together : for the principal circumstance to be attended to in making etching ground, is completely to dissolve the asphaltum ; for although all the recipes I have read or heard of, direct the Burgundy pitch to be added *last*, yet I am convinced, from much experience, that as Burgundy pitch is the true solvent for asphaltum, these two ingredients should be first thoroughly mixed, by which means only can the real and beneficial effects of the asphaltum be fully obtained.

From what has been stated above, the following general rules or principles are deduced.

First, that asphaltum gives hardness and toughness to etching ground, and is indispensably necessary, on account of its valuable property of resisting the action of dilute nitrous acid.

Secondly, that Burgundy pitch acts as a perfect solvent for the asphaltum ; and, when mixed, acts also as a vehicle to spread the ground over the surface of the copper-plate, a property essentially necessary to prevent foul biting.

Thirdly, that virgin wax assists in softening the ground, and giving it such a consistence, that when lines are cut through it by the etching point, the edges of each line will be extremely clear and free from flaws or chips, which would be destructive of the beauty expected from the etchings of the present improved state of the art of engraving.

I beg leave to observe, in conclusion, that my principal object in this communication is to lay before my brother artists the result of several years experience, gained by careful practice, rather than submit to them novel experiments or arbitrary recipes which fix no useful or general

principles in the mind, without which every attempt to modify or alter the composition, must be attended with uncertainty, and too frequently with disappointment.

NO. II.

COLOURED PRINTS IN IMITATION OF
DRAWINGS.

*The LARGE SILVER MEDAL and FIFTEEN GUINEAS
were this session presented to Mr. WM. SAVAGE, Cowley-
street, Westminster, for his improvements in Block
Printing in imitation of Coloured Drawings.*

SIR,

19th January, 1825.

AFTER laying the specimens of imitations of drawings, produced by the common process of letter-press printing, before the Society of Arts, I beg that you will do me the favour to submit to the Committee of Fine Arts, to which they are referred, the following practical observations on the method of printing them, and on the materials employed in the different inks.

Previous to these observations it may, perhaps, be advisable to take a short retrospect of what had been previously done, to show to the committee clearly my views of the grounds on which I presume to come forward as a candidate for a premium ; for although there is no specific class in which I can claim, yet I think the second paragraph in the general notice to candidates gives me a well